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**Joseph M Mahaffy\*** (mahaffy@math.sdsu.edu), Dept. of Math Sciences, San Diego State University, San Diego, CA 92182. *Marine Phage Ecology*. Preliminary report.

Marine phage are virus that infect bacteria in the ocean. There are about  $10^{31}$  phage in the oceans, yet little is known about phage ecology and population dynamics. Each day they destroy about 25% of the marine bacteria, playing an important role in the carbon cycle of the oceans, which is a significant part of the global CO<sub>2</sub> cycle. Our studies have used shotgun sequencing and mathematical models based on a Lander-Waterman algorithm to learn about species diversity and abundance. Studies show that the ratio of bacteria to phage remains fairly constant (about 1:10) through a variety of habitats. We develop a two compartment model and fit a number of parameters to explain how this ratio can be maintained. A modified model with delays using quorum sensing of the bacterial population by the phage shows how adaptations of phage between lysogenic and lytic life cycles can produce oscillations in the phage and its host populations, while the ratio of bacteria to phage still remains fairly constant. (Received August 30, 2005)